

# 10

## **PERFORMANCE MEASUREMENT, EVALUATION, REVIEWS, AND REPORTING**

Managing project performance includes techniques used by the PM and staff to measure, grade and, as appropriate, reward contractor performance. The levels of control or oversight and contract type are the drivers for determining the type and complexity of the process used for measurement and level of implementation. DOE and DOE contractors should establish and use a method of measuring and reporting project performance according to their contract responsibilities. In all cases, the measurement process is to be cost-effective and represents a contractual requirement between DOE and the contractor. The performance management techniques most-often applied within DOE include earned value, award fee, performance-based incentives, and performance indicators. While these methods of measurement and their application are described here, there are other performance management techniques that may also be used (e.g., cost-sharing incentives). The type of project and contract may dictate the most appropriate technique to be applied. Project reviews and reporting are important steps in the planning process. They provide verification and assurance that the mission can be met, provide project status versus plans and evaluate progress-to-date and to-completion.

### **10.1 PERFORMANCE MEASUREMENT—GENERAL**

Measuring and reporting project performance on a scheduled basis is a key project management responsibility. This process demonstrates progress toward accomplishing goals and objectives, and helps project management perform the following:

- Assess the results of activities compared with planned goals.
- Determine progress toward achieving the project's mission.
- Improve performance at all organizational levels.

**No later than final APB approval, every project shall have a functioning Performance Management System (PMS).**

Performance measurement activities assist the PM in the following ways:

- Provide the basis for making informed management decisions.
- Keep responsible organizations and stakeholders apprised of successes, problems, progress, and results.
- Provide a common link between planning, budgeting, initiation, definition, execution, and evaluation.
- Provide a basis for establishing accountability.

Performance measurement systems are generally most effective when supported by an EVMS. Projects having a TPC greater than \$5M, the application of performance measurement should be imposed on contractors, suppliers, vendors, manufacturers, and support organizations, as appropriate. **For projects having a TPC greater than \$20M, the PMS shall be an EVMS system that fully complies with ANSI/EIA-748.**

#### *10.1.1 Measuring for Results*

Systematic measurement of baseline performance should be conducted by each project in order to measure and compare planned vs. actual accomplishments and costs. The performance measurement activity monitors the quality and utility of technical, schedule, and cost baselines. This activity recognizes that the primary goal is improved management, better control, and informed decision-making, not just measurement.

#### *10.1.2 Measurement Considerations*

In developing metrics to assess performance against baselines, consideration may be given to ensure the following:

- Project WBS should be the common framework for all baselines.
- Technical scope is defined for all work elements.
- Schedule and cost baselines are traceable and linked to each other and to the technical baseline.
- The technical baseline is traceable and linked to the project mission.
- The [level](#) of baseline detail is commensurate with the project phase, and tailored as appropriate.

Metrics focus on output and the achievement of overall output goals (as opposed to input or process) and help avoid micro-management.

The following summary four-step process highlights the process involved in developing and using a performance measurement system:

- Planning (identifying and defining the metrics to be used)
- Measuring (achievement/progress/performance)
- Comparing (performance with goals)
- Correcting (identifying corrective actions for unacceptable performance).

As a project progresses from Initiation through Transition/Closeout, performance measurement criteria should be periodically reviewed and updated. Metrics or criteria not being met (performance varies from plan) are reviewed and evaluated to determine the reason(s) for the variance(s) and to identify corrective action(s). This review may involve all project team members and can identify existing problems, potential problems, corrective actions, responsible individuals, and completion dates.

As discussed elsewhere in this Chapter, metrics are a “broad” measurement while earned value is directly linked to project scopes, i.e., technical, schedule, and cost. If desired,

metrics can become earned-value items by linking them directly to cost and schedule baselines.

The DOE expects a consistent relationship between performance measurement and key DOE planning and reporting documents, such as the annual budget submissions, because the DOE has specific congressional and OMBE reporting requirements.

#### **10.2 Earned Value Management System**

DOE requires that projects having a TPC of \$20M or greater are to implement at CD-2, an EVMS, which meets the full intent of the criteria presented in ANSI/EIA-748-1998, "Earned Value Management System."

An EVMS is implemented to assist project management in effectively integrating a project's technical elements with schedule and cost elements. The primary purpose of the EVMS is to support management in measuring project performance and determining the status of work completed in comparison to that planned. A fundamental requirement of the acquisition of materiel assets by the Government is insight into contractors' progress for project management purposes. The implementation of an EVMS ensures that the PM is provided with contractor cost and schedule performance data. EVMS guidelines incorporate best business practices and are at a purposely-high level to permit individual company flexibility in adapting them to meet their specific management styles and business environments.

The basic approach to implementing an EVMS includes:

- Correlating the project's technical, schedule and cost elements with the project WBS.
- Planning all work that the project is to complete.
- Integrating technical, schedule, and cost elements into a baseline plan at the work control account level against which performance (accomplishments) can be measured.
- Objectively assessing accomplishments at the work performance (work package) level.
- Analyzing significant variances from the plan and forecasting the impacts.
- Providing data to higher levels of management for decisions, and for identifying and implementing corrective actions.

##### **10.2.1 EVMS Basics**

The essence of earned value management is that at some level of detail appropriate for the degree of technical, schedule, and cost risk (or uncertainty associated with the project), a target value (e.g., budget) is established for each scheduled element of work. As work is completed, target values are "earned." As such, work progress is quantified and earned value becomes a metric against which to measure: the funds spent to perform the work, and the work scheduled to have been accomplished.

Schedule variances (not seen in a stand-alone budget versus actual cost tracking system) are identified and quantified. Also, cost variances are true cost variances that are not

distorted by schedule performance. This provides early awareness of true/unmasked performance trends and variances from baselines, and allows management to make informed decisions while there is time to implement corrective actions. Without the use of earned value concepts, a manager can generally only compare planned with actual expenditures. This comparison, however, does not provide any indication of the planned work that was accomplished or not accomplished.

For earned value benefits to be realized, planning along with the establishment and maintenance of a baseline for performance measurement are necessary. Advance planning, baseline maintenance, and earned value analysis yield earlier and better visibility of project performance than that of nonintegrated methods of planning and control. For projects having a TPC less than \$20M, implementation of an EVMS is not required (but may be desirable).

#### *10.2.2 EVMS Standard ANSI/EIA-748-1998*

The EVMS Standard ANSI/EIA-748-1998 contains 32 “guidelines” that are sorted into five major categories:

- Organization
- Planning, scheduling, and budgeting
- Accounting Considerations
- Analysis and Management Reports
- Revisions and Data Management.

These 32 guidelines evolved from what previously were called “criteria” (35) under the Cost/Schedule Control System Criteria (C/SCSC) developed in the 1960’s.

The Standard also contains a section on “Common Terminology” which provides definitions of the terms and concepts used to build and understand the application of EVMS. In addition, a section, “EVMS Process Discussion,” is provided to aid in the understanding and application of earned value management techniques. The additional sections of the Standard provide a comprehensive and practical understanding of the principles of earned value management. This understanding, however, may be coupled with actual experience in the application of the principles and guidelines in a comprehensive business management system environment.

#### ***10.2.2.1 EVMS Implementation***

In designing, implementing, and improving an EVMS, the objective is to do what makes sense. An EVMS that complies fully with the intent of ANSI Standard EIA-748-1998 will exhibit the characteristics of a good EVMS. Some of these characteristics include thorough planning; information broken down by organization and product; objective measurement of accomplishing tasks against the EVMS; summary of the level where work is performed, reported to management for use in decision-making; improved reporting discipline; and

implementation of management actions to manage risk, cost, and schedule performance. The responsibility for developing and complying with the Standard rests with the performing organization, whether contractor or the DOE. The OMBE Earned Value Guide (new) will be provided for the DOE and contractor use in implementing their system. The degree of compliance is not only in the number of criterion met, but in the form and substance of meeting each criteria. In some cases, certain criterion may not be applicable or feasible. For projects where this is the case, the management control system plan should discuss those criterion. Projects with a low level of complexity and risk, such as construction of a building may not require the same rigor associated with a more complex project requiring significant and sometimes concurrent technology development, engineering, procurement, and implementation.

All Department prime contractors doing project work are to implement an EVMS that meets the criteria of ANSI/EIA-748-1998. If, at the time of award, the contractor's EVMS has not been recognized as complying fully with the Standard, the contractor is to apply the EVMS, and be prepared to demonstrate that the system complies with EVMS criteria. The contractor is to certify compliance to the appropriate CO with a copy to OMBE. This includes maintaining and making available the documentation that supports the system compliance.

The approval authority for EVMS implementation is OMBE for all projects. **All newly established and selected existing EVMSs shall be certified by OMBE. Existing systems shall, if not already done provide OMBE documentation demonstrating current compliance with the Standard.** Any project may directly request OMBE approval in lieu of other processes, if desired. This may be obtained as early as possible in the project, but in all cases will be obtained prior to APB establishment (CD-2). All newly established EVMS systems should be approved.

For existing systems, DOE may require an OMBE EVMS implementation review. Such reviews should be scheduled as early as practicable and should be conducted within 180 calendar days after the contract award, the exercise of significant contract options, or the incorporation of major modifications.

The objective of the review is for the DOE and the contractor to jointly assess compliance with the Standard. This will be accomplished by assessing specific areas, such as the contractor's planning, to ensure complete coverage of the statement of work, logical scheduling of the work activities, adequate resourcing, and identification of inherent risks.

**Once an EVMS system has been approved, all significant proposed changes must obtain Government concurrence prior to implementation.** The Government will advise the contractor of the acceptability of such changes within 30 calendar days after receipt of the notice of proposed changes. If the advance approval requirements are waived by the Government, the contractor should disclose EVMS changes to the Government at least 14

calendar days prior to the effective date of implementation. The EVMS approval authority is also authorized to approve a waiver.

The contractor will provide access to all pertinent records and data requested by the Government or duly authorized representative. Access permits Government surveillance to ensure that the EVMS complies, and continues to comply with the criteria.

Contractors will, at the discretion of the Government, provide documentation that the DOE or other Federal agency has recognized that their EVMS complies with the criteria of the ANSI standard. OMBE should be provided a copy of all approvals for all projects issued by Government project offices or Program Offices.

If the contractor has a system that does not meet the standard or has not been recognized by a Federal agency as compliant with the standard, the contractor should submit a comprehensive plan for compliance with the EVMS criteria.

The EVMS should:

- Describe the EVMS the contractor intends to use in performance of the contract.
- Distinguish between the contractor's existing management system and modifications proposed to meet the criteria.
- Describe the management system and its application in terms of the criteria.
- Describe the proposed procedure for administration of the criteria as applied to subcontractors.
- Provide documentation describing the process and results of any third-party or self-evaluation of the system's compliance with EVMS criteria.

If the contractor proposes to use a system previously approved by the Department or other Federal agency, the project office, or Program Office should submit a memorandum to OMBE stating that the project will use a previously approved system, and include the particulars of that approval. An EVMS that was previously approved for a small project may not be deemed as adequate for a major system.

The contractor should provide information and assistance as required by the Government to support review of the EVMS. If a M&O contractor is responsible for all or a significant number of projects, a programmatic review of the site's standard EVMS is acceptable. The Government will review the contract plan for the EVMS before contract award or prior to authorizing the contractor to proceed with the project when there is an existing contract for management, operation, or integration.

Contractors should identify the major subcontractors, or major subcontracted effort (if major subcontractors have not been selected), that are planned for application of the criteria. The prime contractor and the Government should agree to subcontractors selected for application of the EVMS criteria.

### 10.2.3 Performance Measurement Baseline Establishment

The assignment or allocation of budgets to scheduled segments of work produces a plan against which actual performance can be compared. This is called the Performance Measurement Baseline (PMB). The establishment, maintenance, and use of the PMB are indispensable to effective performance measurement. The PMB should be in place as early as possible after authorization to proceed. The relationship of individual work tasks with the time-phased resources necessary to accomplish them is established at the control account level. When practicable, all control accounts should be planned, at least at a summary level, to the end of the contract. Any control accounts that cannot be established in the initial planning effort, may have the critical defining event(s) that are necessary for planning identified, and made an item of continuing management interest.

**Summary Level Planning Packages.** When it is clearly impractical to plan authorized work in control accounts (CAs), budget and work may be identified to higher WBS or organizational levels for subdivision into CAs at the earliest opportunity. The budget for this effort should be identified specifically to the work for which it is intended, be time-phased, have its value periodically assessed, and have controls established to ensure this budget is not used to perform other work. The maintenance of realistic budgets, directly tied to an established scope of work, is essential for each organization responsible for performing project work. Eventually, all work will be planned by specific organizational elements to the cost account level. This is frequently accomplished by using a “rolling wave” technique. Planning horizons can be used to establish reasonable control account level assignments of work and budget. Summary level planning is not a substitute for early and definitive detailed planning.

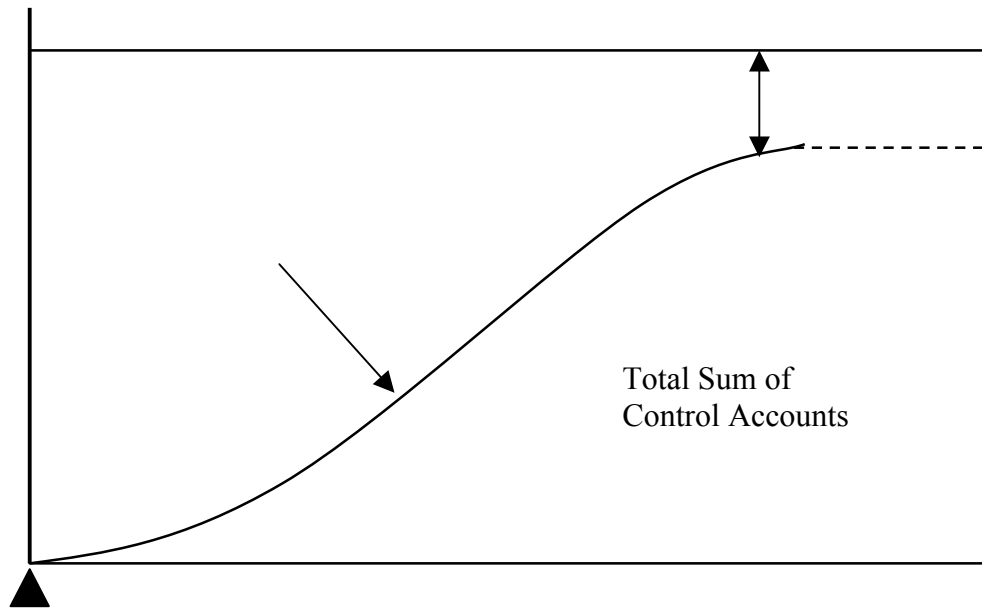
**Authorized, Unpriced Effort.** For authorized, unpriced work, the contractor may plan and budget near-term effort in control accounts, with the remaining effort and budget planned in summary level planning packages or maintained in undistributed budget (UB) during the period of negotiation. After definitization, the remaining effort will be planned and budgeted within control accounts as soon as practical.

#### 10.2.3.1 Considerations in Developing Performance Measurement Baselines

Once a project has subcontracted for all or part of an APB, the earned value process should address the requirement that the performing organization is to integrate budget and work planning requirements and provide time-phased performance reports. This requires the development of a PMB that is a subset of what is generally the CBB. Figures 10-1 and 10-2 highlight the essential elements of a CBB and PMB. The APB is not shown in Figures 10-1 and 10-2 because it would normally consist of several CBBs.

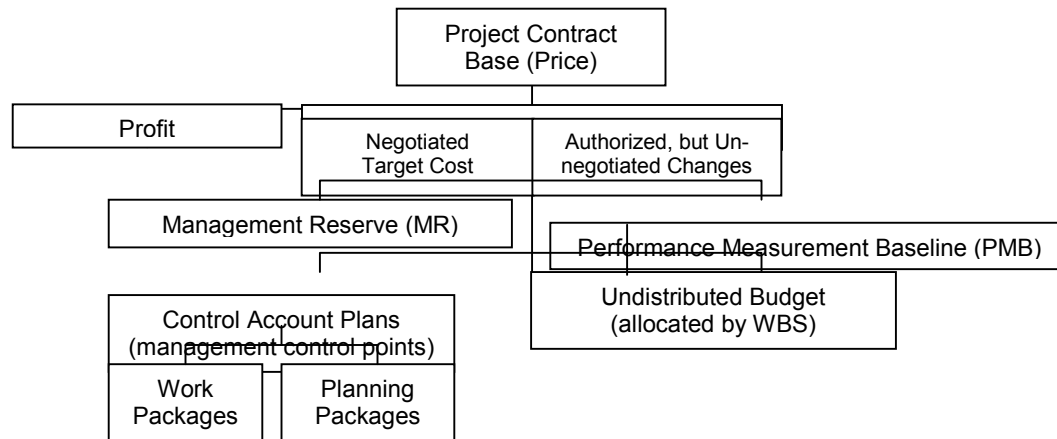
#### Contract Budget Base

Contractor  
Mgmt. Reserve



**Figure 10-1. Performance Budget Baseline**





**Figure 10-2. PMB for a Complex Project**

In establishing the APB, a risk assessment is performed which identifies risk allocations associated with both the schedule and cost baseline. Generally, for large and complex projects, this is done with a statistical model that provides various confidence levels of success. In placing a contract or agreement, whether it is placed with a Management and Operating (M&O), Management and Integration (M&I), other Government contractor, or through competitive bid; the Government should understand the schedule and cost risk adjustments and maintain adequate control of the buffer/trade space between the APB, TPC, and the agreed-to CBB. Contingency is that budget held by DOE that is not put on contract. The risk-based approaches applied in Chapter 9 in creating the APB (see Chapter 8) provides the needed data to understand and set/agree to the CBB, and hence the subsequent establishing of the PMB and use of contractor management reserve. The risk-based approach to handling this accounts for schedule and cost estimating uncertainties inherent in formulating the APB TPC, and hence setting or agreeing to the CBB. These techniques help establish an 80% to 85% underrun confidence level for the TPC (Figure 10-3).

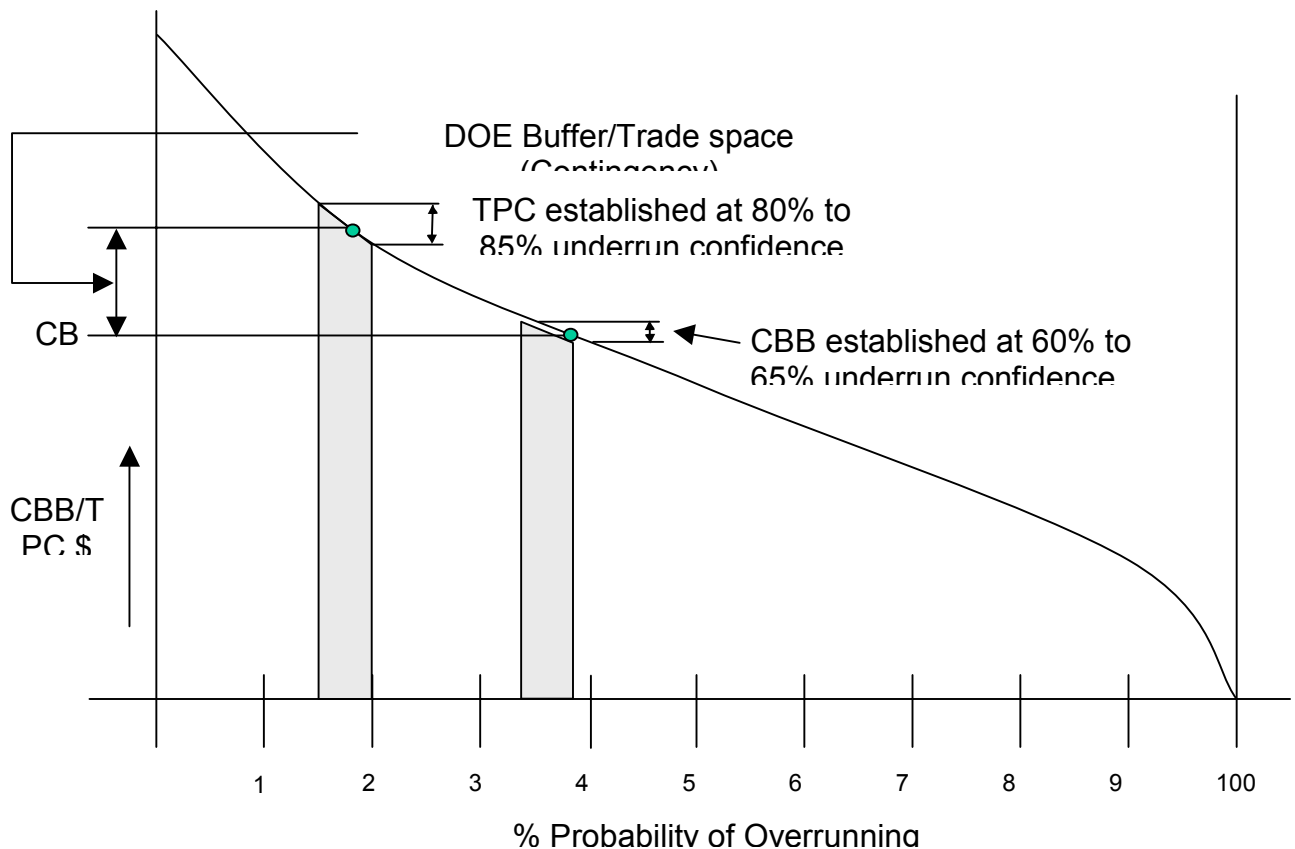


Figure 10-3. Utilizing Monte Carlo Simulation in Establishing the CBB

The probability and cost distributions assigned to the statistical simulation (generally a Monte Carlo or deterministic risk-based approach) should account for all uncertainties, including the degree of scope and design definition, maturity of technology, first-of-a-kind efforts, project cost structure, funding profile assumptions, and potential cost impacts due to scheduling uncertainties. If all these uncertainties are not captured in the simulation elements, then the 80% to 85% “confidence” level is likely to provide a false and misleading sense of security. The PM is responsible for selecting the process to establish the confidence level and for project completion within the resulting TPC. The risk-based allowance using this approach establishes the project’s CBB at the 60% to 65% underrun confidence level at the start of the project. During project execution, the DOE risk-based allowance is transferred to the CBB via documented change control in response to events/changes that are not within the contractor’s control.

The contractor project manager is responsible for executing the defined scope within the CBB. The assumptions used in the simulation and the confidence levels used to establish the TPC and CBB should be documented in the PEP. During project execution, the risk analysis basis may be periodically reviewed and revised.

### ***10.2.3.2 Performance Measurement Baselines in Excess of Contract Value***

During the life of a project, situations may arise whereby available budgets for the remaining work are insufficient to ensure valid performance measurement. Under these circumstances, a requirement may exist for the total budget allocated to work to exceed the recognized CBB. The resulting value is referred to as an Over-target Baseline (OTB). Establishment of an OTB may entail replanning future work, replanning in-process work, and/or adjusting variances (cost, schedule or both). This allows the project to increase the amount of budget for the remaining work to a more realistic amount to adequately provide for reasonable budget objectives, work control, and performance measurement.

A thorough analysis of contract status is necessary before the implementation of an OTB. The contractor is to perform a detailed estimate of all costs necessary to complete the remaining effort. If the difference between the estimated cost-to-complete and the remaining budget is significant, the contractor will notify the appropriate parties of the need to increase the remaining budgets. It is imperative that the contractor consult with the PM prior to implementing the over-target baseline. This consultation may include a discussion regarding project cost, schedule, funding and technical implications expected as a result of implementing the proposed OTB.

When the PMs are satisfied that the new baseline represents a reasonable plan for completing the contract, the new baseline becomes the basis for future performance measurement.

In implementing an OTB, the changes to baseline budgets should be fully documented and traceable. If variances are adjusted, their cumulative values before adjustment will be retained to ensure traceability. Establishment of management reserve within the OTB is acceptable. OTBs, or changes to OTBs may be limited to situations where changes are needed to improve the quality of future cost and schedule performance management. OTB in itself may or may not cause a breach of the APB. (APB breaches are addressed in Section 8.3.)

#### ***10.2.4 EVMS Tailoring***

The Standard provides for a tailored approach to earned value. Larger, more complex projects generally need to implement the full set of guidelines, but smaller, less complex projects may tailor implementation to less than the full guidance. Assistance in applying tailoring is available through several sources. An existing model (see the Practices) is available for industry application. Also, the Project Management Institute (PMI) has provided guidance. This guidance identifies 10 of the 32 guidelines as providing “a simple form of earned value for the masses.” The 10 guidelines (criteria) are listed and addressed below.

#### ***10.2.4.1 EVMS Guideline 2.1.a***

“Define authorized work elements for the program. A WBS, tailored for effective internal management control, commonly is used in this process.”

The WBS defines the full technical scope of the project in the simplest terms and/or displays. It is a hierarchical division of major project segments that define product-oriented deliverables: hardware, software, services, data, intellectual points. It provides a common framework to integrate schedule and cost with project scope. It is a cornerstone of the management system.

#### ***10.2.4.2 EVMS Guideline 2.1.b***

“Identify the program organizational structure, including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.”

Once the work has been defined in the WBS, it is to be assigned to responsible “individuals/organizations.” These owners are generally organizational entities (rather than individuals) who may in turn either perform or outsource the necessary work required to perform/produce the project deliverables. The use of control accounts within the WBS hierarchy assigned to responsible owners helps facilitate this guidance. The assignment of WBS elements to project organizational elements results in the WBS/OBS responsibility matrix.

#### ***10.2.4.3 EVMS Guideline 2.1.c***

“Provide for integration of the company’s planning, scheduling, budgeting, work authorization, and cost accumulation processes, and as appropriate, the project WBS and organizational structure.”

The project management system processes need to be integrated with and consistent with each other and employ a common informational database that transcends functional organizations. The WBS is intended to be the common framework for building all other project estimates and functions.

#### ***10.2.4.4 EVMS Guideline 2.2.a***

“Schedule the authorized work in a manner that describes the sequence of work and identifies the significant task interdependencies required to meet the requirements of the program.”

Using the WBS identified work scope as the basis, plan the work activities through the development of a master schedule, and, if appropriate, supporting schedules, while keeping in mind logical ties and target completion dates. The schedule can then be used to identify the project’s critical path, depict constraints and important interfaces, identify significant milestones, and establish the basis for the time phased performance measurement baseline.

#### ***10.2.4.5 EVMS Guideline 2.2.b***

“Identify physical products, milestones, technical performance goals or other indicators used to measure progress.”

As discussed elsewhere in this Chapter and also in the Practices, the measurement of performance forms the basis for determining meaningful status and performance measurement. A number of techniques are available. Many, if not most, of the metrics established through an EVMS may be consistent with, or identical to, the metrics used for milestones, performance incentives, and other outputs used in managing the project.

#### ***10.2.4.6 EVMS Guide 2.2.c***

“Establish and maintain a time-phased budget baseline at the control account level against which program performance can be measured. Initial budgets established for performance measurement will be based on either internal management goals or the external customer-negotiated target cost, including estimates for authorized (but incomplete) work. Budget for long-term efforts may be held in higher level accounts until an appropriate time for allocation at the control account level. On Government contracts, if an over-target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.”

All authorized work is to be reflected in the PMB. The PMB is derived from summarizing the budgets of all control accounts. This includes higher level (WBS) “planning packages” for future authorized work that has not yet been planned in near-term, active control accounts using the baseline schedule for activity timeframes and pre-approved earning rules for spreading budget within these timeframes. The PMB will include all costs, direct and indirect, appropriate to the work scope.

#### ***10.2.4.7 EVMS 2.3.a***

“Record direct costs consistent with the budgets in a formal system controlled by the general account books.”

Contractors will have pre-established accounting methodologies that generally meet this guideline. Contractors are expected to utilize accrued/applied costs and they should be recorded in the same period that they were performed. This enables a true comparison of costs (including accrued costs) with the budgeted value planned for the same period. Project Control Staff ensure the budgeted and actual cost of work is kept in-sync for proper comparison.

#### ***10.2.4.8 EVMS 2.4.a***

“At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system: Comparison of the amount of planned budget vs. budget earned for work accomplished. This comparison provides the schedule variance. The amount of the budget earned vs. the actual (applied where appropriate) costs for the same work. This comparison provides the cost variance.”

This guideline enables the measurement of earned value as opposed to the more traditional “spend variance” that is generated by comparison of actual costs with the planned budget. Sufficient details need to be provided within the control account to enable analyses of any variances so as to pinpoint the problem (labor, material, subcontracts, etc.), and identify a solution.

#### ***10.2.4.9 EVMS Guide 2.4.f***

“Develop revised cost estimates at completion, based on performance-to-date, commitment values for material, and estimates of future conditions. Compare the information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements, including statements of funding requirements.”

The determination of a valid, periodic forecast of costs or Estimate at Completion (EAC) is essential in the DOE environment with its strict budgetary limits controlled by Congress. This EVMS guideline requires the generation and maintenance of such an EAC.

#### ***10.2.4.10 EVMS Guide 2.5.a***

“Incorporate authorized changes in a timely manner, recording the effects in budgets and schedules. Base changes on the amount estimated and budgeted to the program organizations.”

Once established, baselines are formally controlled through the use of a change process that evaluates, approves, and documents impacts and reasons for changes to the baseline. Changes are never used to correct completed performance. Normally, changes in budget are related to scope changes.

### **10.3 Project Management Metrics**

Project management metrics and earned value are somewhat similar in intent, yet different in execution. They are similar in that both are used to evaluate/measure project progress and performance. Earned value uses the total budgeted value of that portion of the scheduled work that was actually accomplished (Budgeted Cost of Work Performed). It is thus directly linked to the details of the project schedule, cost estimate, and technical baselines. Performance metrics, on the other hand, are stand-alone measures of physical progress, such as:

- Material quantities to be processed: mass, volume, number of containers, handling units.
- Documents delivered: Safety Analysis Report (SAR), PEP, Seismic Study.
- Products delivered: yards of concrete placed, tons of rebar installed.

Typical metrics/performance indicators used on DOE projects include the following:

- **Milestone Reporting.** All project milestones are statused on a monthly basis, identifying scheduled completion dates, actual completion dates, and forecast completion dates for milestones expected to be different from those scheduled.
- **Technical Progress Indicators.** Certain product or production-oriented parameters are evaluated/measured periodically and compared to time-phased plans for measuring schedule performance. Examples of such indicators include gallons of waste processed, number of drums produced, tons of soil removed, or cubic yards of concrete placed.

Whereas these indicators provide an accurate measurement of schedule performance, they do not translate to the direct measurement of cost performance. However, the progress-to-date and forecast schedule completion dates are useful. For example, waste stream data is periodically provided at a customer's request and used along with similar information from other DOE sites for quarterly tracking of national cleanup information.

Regardless of the performance measurement techniques implemented on a project, each project should (on a tailored basis) prepare a list of metrics that can be used to gauge project progress on an overall basis. These metrics are reviewed and approved by the PM and included in the PEP. These metrics usually prove most useful if the progress of a tracked item is provided in graphical form (e.g., pie chart, histogram, bar chart). Metrics are also useful in evaluating subcontractor performance. Typically, applicable metrics are identified in a subcontract so no misunderstandings exist about what is desired and expected of the subcontractor.

In-house support performance may also be evaluated using metrics. For example, the time required to review design packages, types and number of review comments, number of surveillances and audits performed, number of welds radiographed, and so forth.

Safety is an important area where metrics are often used to measure company, organizational, project, and subcontractor performance. Typical examples include lost-time accidents, reported injuries, attendance at safety meetings, contamination incidents, radiation exposures, and so forth. In these cases, project performance can be compared to company performance, DOE performance, industry performance, and past-period performance. In the case of safety graphs and curves, a secondary use is projecting future performance and identifying needed training.

#### **10.4 Project Reviews**

Reviews are part of the planning process and are used to assist the PM and upper-level management in developing project plans and verifying that the project mission will be met. Reviews provide information to help make decisions, and demonstrate and confirm a project's accomplishments at various stages. The core of all DOE Project Reviews is a presentation of EVMS indicators when EVMS is employed. Such indicators include, as a minimum, Cost Performance Index (CPI), SPI, EAC, ETC, and a trend of MR use. CPIs/SPIs are to be based upon a rolling assessment, evaluated down to at least a Level-3 of most projects. The objectives of reviews include:

- Ensure readiness to proceed to a subsequent project phase.
- Ensure orderly and mutually supportive progress of various project efforts.
- Confirm functional integration of project products, and efforts of organizational components.
- Enable identification and resolution of issues at the earliest time, lowest work level, and lowest cost.
- Support event-based decisions.
- Control risk.

Two major functions of the PM and the IPT are to prepare project status reports and to conduct project status review meetings. Properly planned and presented, these efforts reduce the number of information requests imposed on the project. These two activities are to be timely, informative, and accurate.

Reviews communicate information on current status, progress, completeness, correctness, or work completion. Reviews include users, suppliers, contractors, managers, stakeholders, and peers. Under the direction of the PM, the project should involve the user in organizing, scheduling, and presenting project reviews. One or more of the following types of reviews are performed in support of DOE projects:

- **Regular/Periodic.** Involves project status, trends, design and construction progress for systems and interfaces. These reviews include monthly reviews, quarterly reviews, peer reviews for development work, and so forth. All are an integral part of ongoing project activities.
- **Special Areas of Concern.** Involve critical technology, hazards, special procurements, etc. Some of these reviews can be planned and budgeted in advance, others will be on an as-needed basis. All such unplanned reviews are funded by the project.
- **Event-Driven.** Involves mission validation, SAR, baseline validation. These reviews are necessary to obtain approval to proceed to follow-on project phases. These reviews are an integral part of a project and are planned in advance; most are performed by independent entities.
- **Unscheduled.** Could involve the General Accounting Office (GAO), DNFSB, DOE Headquarters, or the user. Generally performed on projects with high congressional visibility or projects that experience schedule or cost difficulties. For large, visible projects these reviews may be anticipated and planned, and should include both schedule and cost components.
- **Status Reviews.** Performed to determine the current condition of a project or activity. For example, progress towards completion, compliance status, or readiness to proceed. Reviews could include items (project baseline, requirements, subsystem, or the project end product), or activities (planning, design, or construction). These reviews can involve



management and/or the user. Products from these reviews include review plans, review reports, action item lists, and action item resolution reports.

- **Design Reviews.** Design reviews determine if a product (drawings, analysis, or specifications) is correct and will perform its intended functions or meet requirements. These reviews are peer or internal reviews and are an integral part of the project test and evaluation effort and may be planned as such.

Reviews are generally organized and provided by project personnel, including contractor and subcontractor personnel. Others are used when needed, such as technology experts, engineering management, senior management, the end-product user, and appropriate stakeholders. A review has a specific objective and the performers plan the review to meet the objective. Review information is generally presented in a meeting setting with the review participants questioning the presenters to assure a thorough understanding of the material. Unresolved issues are placed on an action-item list and the action assigned to individuals for resolution within a specified performance period. A review report is prepared that summarizes the results of reviews and includes a list of unresolved or open issues and responsible personnel. Resolutions of unresolved issues noted during a review are documented. Critical design reviews, CD-0 through CD-4, held during a project life cycle, assesses the status of a project in order to obtain approval to proceed to the next phase.

Reviews are an important project activity and should be planned as an integral part of the project, based on project complexity, duration, and Critical Decision points. Additional reviews may be requested by the user or management. The PM is to establish a balance between a need-to-inform and the cost of providing reviews.

#### *10.4.1 Traditional Performance Reviews*

All of the methods for ascertaining performance are no substitute for a standup, face-to-face presentation by the project that provides a forum for discussing progress/performance. For all projects, the appropriate AE is to conduct a quarterly project performance review with the PM and staff (see Table 2-2). The SAE should conduct quarterly reviews of selected projects as scheduled by the Under Secretaries (see Section 2.4). These reviews provide both information exchange and more detailed information than that provided in status reports.

The contractor may participate in quarterly reviews as appropriate. The review schedule and agenda are coordinated with OMBE, OMBE is invited to participate in the reviews with the senior managers, and OMBE is invited to participate in all project quarterly reviews. A performance review can take many forms. Generally, it is a PM's/contractor project manager's verbal and visual presentation of current program/project status. Such reviews do not replace the contracted fee incentive process, but are an adjunct that provide timely information in an open forum. The performance review is scheduled on a consistent periodic interval to help ensure the attendance of all interested parties, and to avoid the

possibility of long periods of time between reviews. These reviews conducted in the proper interface mode, increase teaming between the DOE and contractor staff.

Performance reviews provide opportunities to provide more specific and detailed project information than possible in a structured, formal status report. These meetings provide opportunities to respond to questions or concerns, discuss future actions and activities, identify needed user or contractor support, and discuss actions or decisions by external entities influencing the project (e.g., OMB, EPA, Congress, DNFSB). Finally, these meetings are a forum for identifying, discussing, and resolving issues (or assigning actions) before issues become a problem.

#### *10.4.2 Independent Reviews*

Peer and/or independent reviews are an important project management tool and serve to verify the project's mission, organization, development, processes, baselines, progress, etc. Reviews may be initiated internally by the project to provide assurance of a particular technology or other facet of the work, or may be independent and conducted by an external, non-advocate organization. Reviews may be scheduled or unscheduled to meet a specific objective or need, such as a budget validation or a CD request. The scope of a review is dependent on the cost/complexity of the project and its current status.

The project may also experience reviews that are initiated by other governmental agencies such as the GAO, Office of the Inspector General, DNFSB, or others. These reviews need to be conducted with as little project impact as possible.

The DOE recognizes that independent reviews are valuable in assessing the status and health of its projects. Independent reviews are conducted by a non-proponent of the project and may be combined for efficiency, as appropriate.

##### ***10.4.2.1 External Independent Reviews***

An EIR is conducted by reviewers from outside the project. The OMBE, in conjunction with the Program and project, selects an appropriate contracting agency, excluding the M&O/M&I contractors, to perform such reviews. EIRs are managed by OMBE. OMBE coordinates all such reviews with the appropriate PAS to define review scope, choose an optimal review time during the acquisition process, minimize impact on the project from conducting multiple reviews, and evaluate credentials of potential reviewing organizations and individuals.

##### ***10.4.2.2 Independent Project Review***

An IPR is conducted by reviewers within the Department. The Deputy Secretary as the SAE, or the PAS, the Operations/Field Office Manager, Program Managers, and PMs can request, authorize, or conduct IPRs as required. The OMBE is included as an invited observer for all planned reviews. OMBE coordinates the extent of participation with the appropriate organization on a case-by-case basis. Members of an IPR team are not drawn from the

responsible Program Office, within a program secretarial organization, from related contractors from the project office, or from a related funding program.

#### ***10.4.2.3 Independent Cost Reviews***

ICRs are used primarily to verify project cost and schedule estimates and support the CD-2 process in establishing project performance baselines. ICRs are part of the performance baseline EIR. However, an ICR or even an Independent Cost Estimate (ICE) may be requested at other times and for other reasons. The OMBE functions as DOE's agent to establish contracts for ICRs. ICRs are documented in formal reports submitted to the SAE/AE by OMBE. Each ICR is reconciled with the current Program Office estimate.

#### ***10.4.2.4 Types of Independent Reviews***

The following reviews should be conducted on all projects having a TPC greater than \$5M:

- Mission Need IPR. This is a limited review of the project prior to CD-0. It validates the mission need and the funding request.
- Performance Baseline EIR. This is a detailed review of the entire project, including an ICR, prior to CD-2. It verifies proposed technical, schedule, and cost baselines; and for projects with a TPC greater than \$20M it will also assess the overall status of the project management and control system.
- Executability Review EIR or IPR. This is a general review of the project prior to CD-3 that may range from an abridged review of specific areas within a project to a comprehensive review of the entire project. As a minimum, it verifies the readiness of the project to proceed into construction or remedial action. This review is an EIR for MS projects with a TPC greater than \$750M, and an internal review (IPR) for all non-MS projects. OMBE should be provided the IPR report for review prior to the Critical Decision meeting.

#### ***10.4.2.5 OMBE Mission Need Review and Acquisition Strategy Review***

OMBE should review all MNSs and their justifications and ASs for projects having a TPC greater than \$5M as part of the CD-0 and CD-1 approvals, respectively. PA&E (ME-20) will review the MNSs and the OECM (ME-90) will review the ASs. These reviews reflect the Department's commitment to assuring improved front-end alignment with the corporate strategy, and their resolve to perform more thorough planning, alternative evaluations, and risk assessments early in the acquisition of materiel assets. These stand-alone documents provide and/or reference the documented rationale for the AE's justification and strategy for moving forward into the Definition phase and the overall acquisition planning and controls that will support the Execution phase of a project. These documents provide the bases for the IPT's consideration and conclusions associated with the alternatives, risk/risk trade-offs, AS, and planning that is required by Chapters 4, 5 and Chapter 9, Section 9.2.2.

#### 10.4.3 *Technical Reviews*

Technical reviews are necessary when uncertainty exists about the outcome of a project effort. If a design is new, untried, or unproven, and no standards against which judgments regarding viability can be made, then a review by appropriately trained and knowledgeable peers is in order. Specific types of reviews can include:

- Alternative systems
- Constructability
- Functions and requirements
- Preliminary design
- Detailed design
- Technology
- System verification
- Physical configuration
- Test readiness
- Functional configuration
- Operability and Reliability, Availability, and Maintainability (RAM).

#### 10.4.4 *Decision-Point Reviews*

Decision-point reviews verify that sufficient (often prescribed) progress is achieved, level of information is developed, and requirements are satisfied to effectively initiate performance of subsequent activities.

The nature of decision-point reviews (excluding CD reviews) can be project control systems oriented, technically oriented, or both. The higher the decision-level, the greater the need to perform a review. Depending on the project needs and the purpose, the scopes of decision-point reviews vary; they can range from simple reviews of minor project elements to Critical Decisions of which five exist. The five project critical decisions are described in the Practice on Critical Decision Packages.

#### 10.4.5 *Operational Readiness Review*

Although titled a review, an ORR is not a project review in the normally accepted use of the term. Rather, an ORR is an in-depth independent evaluation of the readiness of completed facilities, systems, equipment, procedures, personnel, and supporting and interfacing systems and organizations to begin facility operation. Because of the importance of this activity, ORR planning is initiated early in a project's life cycle. Planning may (as a minimum) include the project and the user organization and document decisions concerning assignment of responsible individuals, identification of resource needs, and preparation of a resource-loaded schedule. In most cases, the ORR is a DOE responsibility.

## 10.5 REPORTING

Using the data elements, analyses, and other information specified in this Manual, the PM submits monthly and/or quarterly project status reports to line management, the Project Management Support Office, and the OMBE. Internal project reporting typically begins before or at CD-0 with a comparison of contractor performance with the conceptual design schedule and cost plan, and a comparison of earned value performance against the alternative approval/range estimate at CD-1. External reporting to OMBE is initiated at CD-2 with a comparison of earned value performance with the performance baseline. The Program Manager and PM define the specific reporting requirements in the appropriate project documentation. At a minimum, reports for projects having a TPC greater than \$20M include EVMS performance and financial status.

### 10.5.1 *Project Assessment and Reporting System*

All projects having a TPC of \$5M or more should provide monthly project status using the PARS. These reports can be initiated as early as CD-0. At CD-2, the reporting is to be aligned with the approved APB, which is the performance baseline, once approved. The DOE PAR System is used for tracking project performance and corrective actions. Trending data is established by OMBE for cost, schedule, scope, and timely resolution of corrective actions. The PARS requires monthly reporting of current status. PARS is a full function web-enabled performance assessment and reporting tool that requires DOE program and project managers to input timely summary data, which is defined as 14 days from receipt from the contractor data. PARS can be found at <http://pars.energy.gov>, and includes a user manual and help line. The system is entered by creating a project identifier that consists of the following three types of data:

- Identity or profile data. This is data that is entered one time and is used to identify the project, points of contact, and other identifying information.
- Event data. These are data elements that are associated with the life cycle of a project, such as decision data, milestones, budget, funding, and other information that changes infrequently.
- Status and performance data. This is information which may be available monthly from the contractor's project control system (and other sources) provides information on the progress and overall status of a project. Nearly all-static data elements will be found in the PEP and the PDS. In general, negative replies are not required. Where no data exists for a specific element, leave the field blank. Where a field is not applicable, no entry is required.

Creating a record involves entering both identity and event data. Most of this data can be obtained from the PEP, the PDS, or other similar documentation used in planning the project.

Status reports provide a customer and management with detailed project status information to support project decisions; and if necessary, identify and implement corrective actions.

Each project is responsible for preparing required reports appropriate for the project. All reports are thoroughly reviewed and approved by the responsible cost account managers and the PM prior to release. Typical reports are described in the following sections.

#### *10.5.2 Project Manager's Quarterly Progress Report*

At DOE direction, a quarterly project progress report is prepared for the DOE Program Office. This report provides performance data, financial data, schedule and milestones status, and a narrative assessment of the project's current status. In addition, this report provides earned value data and the status of project milestones.

#### *10.5.3 Other*

The PM and responsible DOE Program Office should determine additional reporting requirements. Agreements will be documented in the PEP.

The PM should submit quarterly project status reports using the data elements, analyses, and narrative information previously specified above. The report includes an assessment of project status by the DOE project staff. The report also identifies problem areas, corrective actions, and corrective action dates.

DOE Program Managers should provide project status reports on a quarterly basis, including their assessment of project performance, as required by the AE.

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